

**PROCEEDINGS**  
OF THE  
**CALIFORNIA ACADEMY OF SCIENCES**  
**FOURTH SERIES**

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**Festschrift for George Sprague Myers**

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Vol. XXXVIII, No. 17, pp. 341-346; 1 fig.

December 31, 1970

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**HOW MANY RECENT FISHES ARE THERE?**

By

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It is a pleasure to dedicate this paper to Professor George S. Myers on the occasion of his 65th birthday. His interests in ichthyology have ranged widely and the topic of this paper seems especially appropriate, not least because he has been interested in this particular problem himself.

Estimates of the number of species of Recent fishes in the current ichthyological literature range from a low of 15,000-17,000 to a high of 40,000. Presented below is a brief list of some.

**SOME PAST ESTIMATES OF NUMBER OF RECENT FISH SPECIES**

Bailey (1960) gave 15,000 to 17,000, of which about 45 are Agnatha and about 575 are Chondrichthys. His estimate was apparently based on a group approach.

Marshall (1965) mentioned that, "We know more than twenty thousand living kinds, but our inventory is by no means complete." He gave no basis for his estimate.

Norman (1963) gave 25,000, with no mention of how the figure was reached.

Myers (1958) stated there are, ". . . 33,000 or more living species of teleosts." No mention of method of estimation was given.

Schultz and Stern (1948) gave a figure of 40,000; however, Schultz (1965) later lowered his estimate to 32,000. No basis was given for either figure.

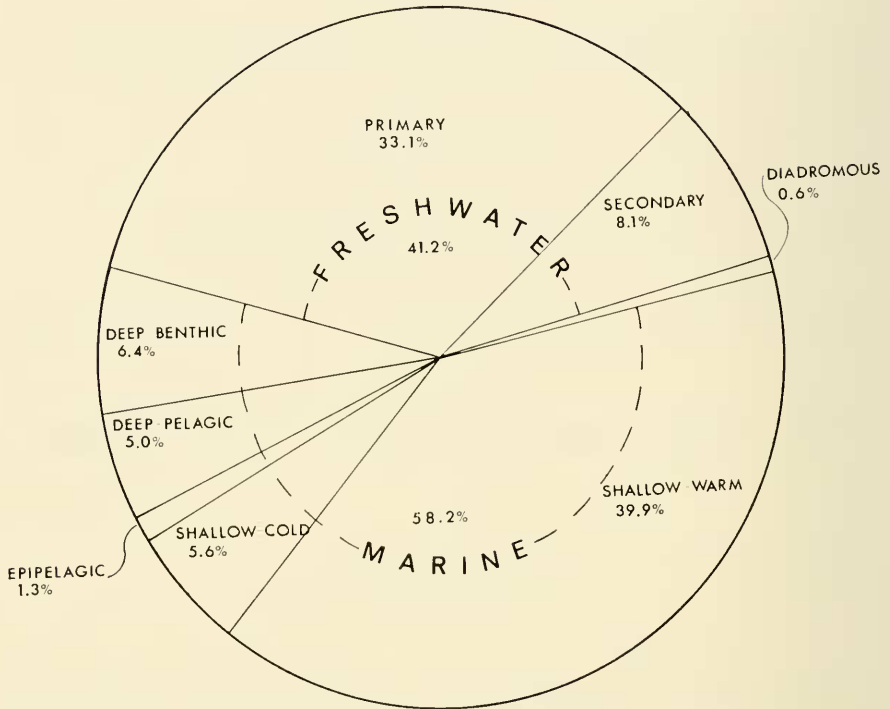


FIGURE 1. Percentages of Recent fish species living in various habitats.

#### MY ESTIMATE OF NUMBER OF RECENT FISH SPECIES

The wide range of figures suggests that a rational estimate, as opposed to an educated guess, is difficult for any one ichthyologist. With this in mind I compiled a list of fish families and began to solicit estimates from specialists and to consult recent revisions. Seven years have gone by since the initiation of the project, and this seems an appropriate time and place to present the results of my canvas. For the several groups for which neither colleagues nor recent revisions could supply information, I was obliged to consult several large faunal works and interpret the results in what I hope was a judicious manner.

Estimates are intended to be of the number of living species rather than described ones. Although approximately 75 to 100 species of Recent bony fishes are described each year (Zoological Record), we lack comparable information on how many species are placed in synonymy annually.

The final results of the present survey are: Agnatha about 50; Chondrichthyes 515 to 555; Osteichthyes 19,135 to 20,980. The figures given for bony

fishes are two minimums rather than a maximum and a minimum. Most specialists who volunteered a single figure gave it as a minimum. Many colleagues, however, gave a range. The first figure, 19,135, is the sum of single estimates and the lower figures of ranges; therefore, it represents a bare minimum. The second figure is the sum of single estimates and the upper figures of ranges; therefore, it is a combination of minimum and maximum estimates.

I have attempted an ecological analysis of the data for Osteichthyes. The figures used for calculating percentages are averages of high and low estimates.

(1) Primary freshwater (Myers, 1949) 6650. *33.1 percent*. Approximately 6200 of this group belong to the Ostariophysi.

(2) Secondary freshwater (Myers, 1949) 1625. *8.1 percent*. Most of the species in this group belong to the families Cichlidae, Cyprinodontidae, and Poeciliidae.

Total freshwater 8,275. *41.2 percent*. If this astonishingly high percentage is valid it must be a reflection of the degree of isolation possible in the freshwater environment.

(3) Diadromous (including Complementary of Myers, 1949) 115. *0.6 percent*. As the systematics and life histories of tropical shore fishes become better known it seems likely that at least some species will be shifted from category 4 to this group.

(4) Marine shore and continental shelf to depths of approximately 200 meters—warm water 8000. *39.9 percent*. Perciform fishes and their derivatives are the major component of this category. Particularly important are percoid, blennioid, and gobioid fishes. Among nonperciforms, eels probably contribute the most species.

(5) Marine shore and continental shelf to depths of approximately 200 meters—cold water 1130. *5.6 percent*. A factor that may contribute to the substantially smaller size of this fauna as compared with that of group 4 is the smaller area occupied. Also, much of the region has had long-term, unstable climatic conditions so that many of the species must be fairly recent in their present habitats. There is no doubt, however, that a high degree of endemism prevails. Important components of this group are Gadidae, Zoarcidae, northern blennioids, and scorpaeniform fishes.

Total marine shore and continental shelf to 200 meters 9,130 *45.5 percent*.

(6) Continental slope and deep sea benthic below 200 meters 1280. *6.4 percent*. Important components of this group are Macruridae, and species of Brotulidae, Zoarcidae, Apodes, and Scorpaeniformes. Contrary to the opinion of Greenwood *et al.* (1966), I do not believe that this group or group 8 contains a great number of unknown species. Fishes of these groups occupy a vast amount of space; however, conditions are relatively so stable and uniform that niches are correspondingly few.

(7) Epipelagic (high seas) above 200 meters 255. *1.3 percent*. Important

groups in this category are Scombroidei and Synentognathi. These fishes are mostly mobile, living in an environment that offers few niches. The small number of species is scarcely remarkable.

(8) Deep pelagic below 200 meters (including mesopelagic and bathypelagic) 1010. *5.0 percent*. Clupeiform and myctophiform fishes are the chief constituents of this category. Probably more space is occupied by this group than by any other, yet the number of species is small. The environment is poor in niches and in energy; it is surprising that the fauna is not smaller.

### SOME CONCLUSIONS

The number of species in any one of the 8 categories seems to be chiefly related to the degree of isolation possible. Certainly tropical reefs, great river deltas, and major river drainages have contributed a great variety of habitats and ecological niches which are reflected in the high percentage of species found in freshwater and along tropical shores.

The most important regions economically (though not necessarily in terms of biological productivity) are the cooler water shelf areas and the epipelagic, both regions with relatively few species.

A final conclusion concerns the freshwater fishes. In view of the high percentage of fishes found in freshwater and man's increasing modification of this environment throughout the world, it is vital that research be drastically increased on the basic systematics of freshwater fishes while this is still possible.

### ACKNOWLEDGMENTS

It is a pleasure indeed to acknowledge the cooperation that I have received from my colleagues. Whatever value this paper may have is due to their contributions. I thank R. Bailey, P. Bănărescu, R. Behnke, F. Berry, J. Böhlke, R. Bolin, M. Bradbury, J. Briggs, W. Burgess, D. Caldwell, B. Collette, E. Crossman, W. Davis, H. DeWitt, W. Eschmeyer, J. Garrick, R. Gibbs, W. Gosline, D. Greenfield, P. H. Greenwood, M. Grey, R. Haedrich, E. Herald, L. Knapp, E. Lachner, R. Lavenberg, N. B. Marshall, H. McCully, R. McDowall, G. Mead, A. G. K. Menon, G. Miller, G. S. Myers, T. Nalbant, N. Parin, J. Randall, W. Richards, L. Rivas, C. R. Robins, R. Rofen, D. Rosen, R. Rosenblatt, L. Schultz, W. B. Scott, V. Springer, R. Suttkus, A. N. Svetovidov, W. R. Taylor, J. Tyler, E. Trewavas, B. Walker, V. Walters, A. Wheeler, N. Wilimovsky, and L. Woods.

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